WAR FOOD ADMINISTRATION
Food Distribution Administration

SOYBEANS AND SOYA PRODUCTS

Program for meeting of

Interdepartmental Nutrition Coordinating Committee

December 7, 1943

Washington 25, D. C.

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SOYBEANS AND SOYA PRODUCTS

Program for December 7, 1943, meeting
of
Interdepartmental Nutrition Coordinating Committee

9:30 - 11:45 a.m.
Room 1409 South Building, Department of Agriculture

PURPOSE OF THE MEETING - M. L. WILSON
Chief, Nutrition Programs Branch, FDA, WFA

INTRODUCING THE SOYBEAN - W. J. MORSE
Bureau of Plant Industry, Soils, and Agric. Eng., USDA

SOYBEANS AND THEIR PRODUCTS AS HUMAN FOOD - - - - - - - - - - - - - H. C. SHERMAN
Chief, Bureau of Human Nutrition and Home Economics, USDA

AVAILABILITY OF SOYBEANS AND SOYA PRODUCTS FOR CIVILIANS - - - - NORMAN L. GOLD
Chief, Civilian Food Requirements Branch, FDA, WFA

SHALL WE PLANT SOYBEANS IN THE VICTORY GARDEN? - - - - - - - - - - H. W. HOCHBAUM
Extension Service, WFA, and Chairman Victory Garden Committee

THE STORY OF SOYA PRODUCTS - DONALD S. PAYNE
Chief, Soya Products Section, Grain Products Branch, FDA, WFA

INFORMATION PROGRAM ON SOYBEANS AND SOYA PRODUCTS - - - - - - - - KEITH HIMEBAUGH
Acting Director of Information, USDA

PREPARATION OF SOYBEANS AND SOYA PRODUCTS IN THE HOME - - - MARY E. KIRKPATRICK
Bureau of Human Nutrition and Home Economics, USDA

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LUNCHEON featuring soya products, served by cafeteria of Department of Agriculture in Room 6962, 12:00 - 1:00 for members of group holding reservations.

INTRODUCING THE SOYBEAN

By W. J. Morse
Bureau of Plant Industry, Soils, and Agricultural Engineering
Agricultural Research Administration
U. S. Department of Agriculture

The people of oriental countries, especially China, have much to teach the rest of the world in the matter of economy in the use of food products. For thousands of years the protein part of the diet of hundreds of millions of Chinese has been supplied or supplemented largely from soybean products. Fermented, the soybean yields all their different sauces, which furnish the basic flavoring of their foods; pressed, it gives oil for cooking; sprouted, it gives a fresh vegetable rich in vitamins; picked when green, it makes an excellent green vegetable; ground dry, it makes flour; soaked, ground, and with water added, it provides milk; and the curdled milk furnishes the famous bean curd - the boneless meat of the Orient - used in the form of various cheeses and as a meat substitute. It has meant bread, meat, milk, cheese, and vegetables to these people, and has furnished what appears to be a well-balanced diet at a relatively low cost. It is rapidly becoming one of the most valuable, if not the most valuable, of China's gifts to the people of the Western World.

Although the many and peculiar uses of the soybean have long been appreciated by the Chinese, it is only within comparatively recent years that the soybean has received much attention as a human food in either Europe or America. Strange to say, the first published use of the soybean in the United States, other than for forage purposes, was as a coffee substitute by the Indiana Experiment Station in 1892. It was revealed that an Indiana farmer and his neighbors had been using the roasted beans for coffee about 8 years. During the past two years, as many of you may know, the soybean has been sold as "Coffee Berry", and "Coffee Plant", and also used extensively to blend with coffee.

The soybean was first used for food in America, beginning about 1910, as a flour prepared chiefly for infant foods and for persons requiring a food of low starch content. At various times the soybean has attracted attention as an article of food, but it was not until World War I, when a cheap and easily obtainable source of protein was being sought, that the soybean was really considered seriously as an American food and the name soybean became fairly familiar. At that time the dry beans were prepared in many ways but owing to the time required for cooking, the peculiar taste, and improper methods of processing, soybean products in general received a poor reception. In most of the oriental foods made from the soybeans, the disagreeable flavor is avoided by the use of special edible varieties and also because of the nature of the products, the preparation of which, for the most part, involves some sort of fermentation, thus changing the flavor entirely.

During that period cooking tests were conducted with all the varieties and introductions then available, in an attempt to find varieties lacking the unpleasant beany taste and which would cook quickly. Only two edible types - the Hahto and Easycook - were found in our 500 varieties and these had rather limited soil and climatic adaptions. For a brief period these varieties became popular in the green and dry stages but food habits are difficult to

change, as is revealed in the history of the introduction of the potato, tomato, and other foods now generally used. Most people have thought of the soybean primarily as a stock feed, a crop to turn under for enriching the soil, or processing for oil and oil meal. Prejudice, custom, and ignorance of foods and food values have much to do in the retarded progress in the utilization of the soybean as food. In 1925 the American Soybean Association held its annual meeting in Washington and in the exhibit of products, the only articles of food shown were canned baked soybeans, diabetic and infant foods, soy sauce, and health soy flour. At the present time more than 50 different foods made wholly or in part from soybeans by about 200 manufacturers are on the market.

The importance of the soybean as an economical and valuable source of food in the human diet is becoming more generally recognized by the average American citizen. The rapid increase in the production of soybeans in the United States during the past decade has caused an expanding interest in the nutritional value of the soybean and in its possibilities as a food. Extensive nutritional studies made during recent years by industry, State experiment stations, and the Department of Agriculture have revealed the unique dietary value of the soybean and its products, and have had much to do with the rapid and growing popularity of the soybean as a food.

The introduction of vegetable varieties of soybeans, which are now available in all sections of the soybean growing region is doing much to overcome earlier prejudices against the use of dry soybeans. This type of soybean has also become quite popular as green shelled beans used in the same manner as green peas or lima beans. During the past season vegetable soybeans were grown extensively in victory gardens, and several commercial concerns canned large packs of the green shelled beans in a similar manner to green peas. Vegetable soybeans led the list of new vegetables planted in the rural gardens in 1942 in South Carolina. Approximately 2000 home demonstration club women in 44 of the 46 counties in South Carolina planted them in the vegetable garden for the first time. In the winter and spring of 1943, 10,000 one-pound packages of dry vegetable soybeans were sold throughout South Carolina.

The soybean through the past few years has risen from an emergency crop to one of major importance, having won its way to its present recognition as a valuable aid to good farming, a commercial worth while crop, a useful nutritious human food, a source of raw material for numerous vital industrial products, and as a highly essential factor in the present international emergency program. It has been stated that the real problem with respect to the post-war food of the world population lies in marshalling the agricultural resources of the world and the proper distribution of foods based on human needs. The comparatively low cost of soybean food products makes them an ideal source of high quality protein. An adequate supply of protein at reasonable cost will be an important point in the post-war feeding of low-income groups in our own country. It will be doubly important in the problems presented by the people to be fed abroad.

The soybean is very much in our news these days and it is said, seemingly with truth, that a country growing soybeans provides food for its people, its cattle, and its guns.

SOYBEANS AND THEIR PRODUCTS AS HUMAN FOOD

By H. C. Sherman, Chief
Bureau of Human Nutrition and Home Economics
Agricultural Research Administration
U. S. Department of Agriculture

Now that we are beginning to realize the importance of what China contributed to human progress in the development of the soybean -- a lesson that our enemies learned from our Ally so much sooner than we did! -- we find this one food coming onto the stage in three distinct characters: Fresh, dried, and milled.

Gathered from the garden while the seed is still soft, the soybean constitutes a new green vegetable, analogous to the fresh lima bean, but with a flavor of its own which should make it not a substitute for any other vegetable but rather an interesting addition to the foods that the home garden can furnish. (So shall we enlarge the Victory garden for this new home crop?)

Secondly: When allowed to mature, the soybean becomes a new and different dry bean, richer in protein and fat than are our hitherto familiar dried beans and peas; and thus especially well fitted to become the "main dish" of a luncheon or dinner. And from now on it should be a point of pride and patriotims to plan meals in such ways as to make fuller use of what our agricultural economists have wisely named direct food crops, -- crops that are brought from the land directly into human consumption without paying the price of feeding to such animals as yield us food only by slaughter. This is a forward step in the use of our growing scientific knowledge and not an "ism" of any kind.

And thirdly: With our national acreage of soybeans now in eight figures, this crop suddenly becomes an important American source of such milled products as soya flour and soya grits. Then, too, the soya flour available at any given time and place may be full-fat, or defatted, or the retail grocer may be able to offer the consumer a choice between the two. This will depend upon the urgency of the demand for soybean oil as a separate commodity, the size of the soybean crop, and the regional availability of the mills for pressing the oil from the beans.

Fats are important for military uses. Also in wartime it may be difficult to provide materials and manpower to build and operate special mills for pressing the fatty oil from the soybeans grown in different parts of the country. So instruction in the use of soya flour should proceed on the basis of an intelligent willingness of the homemaker to use the full-fat or the defatted form or each in turn, according to what the fortunes of war make available to her retail grocer.

I leave it to others to discuss the culinary differences that the higher and lower fat content makes; and the many ways in which soya flour and grits can be utilized: In "conservative" ways which can extend a meat loaf or enrich a loaf of bread without appreciable change of flavor or texture, and in more "progressive" ways to produce things recognizably new.

Assets of the Soybean in General

Our National awakening to the importance of the soybean does much both to make and to mark a new era of closer interweaving of the viewpoints and subject matters of agricultural economics and human nutrition than there has ever been before.

Like other legumes, the soybean improves the fertility of the soil by gathering nitrogen from the air and converting it into protein for itself and us, and other nitrogen compounds for succeeding crops. So superior in this respect is the soybean that we find it to contain about twice as much protein as our other beans and peas. And we find further that the protein of the soybean is of exceptionally high nutritional efficiency both by itself and as a supplement and complement to the proteins of bread and other cereal products. Dr. Jones of our Bureau has shown this clearly and definitely in growth experiments on relatively simple food mixtures, and experiments are now being started to study the relationship, in a more comprehensive range of dietaries and both to extend the feeding trials to human subjects and to longer segments of the life-cycles of experimental animals.

Calcium and riboflavin are now the most critical points in the adequacy of American dietaries and at both these points we again find the soybean standing above the beans and peas which we have hitherto been accustomed to use, and still more distinctly above the cereals. In thiamine content also the soybean and its products rank well above the corresponding products of the cereal grains.

Thus in several important respects (protein, calcium, riboflavin, thiamine) the soybean is outstandingly qualified as a direct food crop to improve American dietaries, while at the same time conserving the Nation's food-production resources.

The more use we make of the soybean, in any or all of its forms, as a human food, the better situated we shall be as regards the adequacy of our food supply for needs both at home or abroad.

Furthermore, in proportion as we build a consumer market for defatted soya flour or soya grits, the corresponding soybean oil goes to meet the Nation's need for fat, and thus makes possible a better conservation of our grain crops by moderating the grain-feeding of meat animals.

And so by a slight and easy adjustment of or within our dietary pattern we can increase our stockpiles of food awaiting shipment -- thus encouraging our Allies, convincing our enemies, and very materially helping the earlier winning of the war.

And, in addition, the solidarity of the United Nations and the prospects of an enduring world peace will undoubtedly be strengthened by any sincere (even if only slight) adjustment of our food habits toward fuller use of direct food crops and less self-indulgent use of foods which are inherently extravagant of resources to produce.

Let our National food habits be such as are consistent with our professed policy of making common cause with our neighbors of the United Nations.

An open-minded and resourceful use of the soybean as human food in the United States -- in the light of scientific knowledge and in the spirit of a sincere willingness to make common cause with other peoples in the interest of good lives for all -- such use of this new resource can help materially to win the war, and can help morally to build an enduring peace.

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AVAILABILITY OF SOYBEANS AND SOYA PRODUCTS FOR CIVILIANS

By Norman Leon Gold, Chief
Civilian Food Requirements Branch
Food Distribution Administration
War Food Administration

From the standpoint of the quantity of human food produced per unit of land and labor the soybean ranks at or near the top of the list of agricultural products. It is therefore an especially important crop in wartime. In 1944 United States civilians will have available more soybeans and soya products than ever before. That this legume is a very valuable food in terms of quality of nutrient content is fortunate for us.

Prior to 1942, relatively small amounts of soybeans or soya products were produced in the United States. Seventy-seven million bushels of beans were harvested in 1940, whereas it is estimated that 209 million bushels will be harvested this year. The goal for 1944 production is slightly over 13½ million acres -- an increase of about 19 percent over acreage in 1943. At average yields this would result in a production of 225 million bushels of soybeans.

Soybeans have many uses, the principal one of which, in this country, is soybean oil meal used in the production of livestock feed. More than 90 percent of the soybeans harvested are processed into oil and soybean oil meal.

For food other than oil, soybeans are used as green shelled beans, dry beans, or as soya products, -- principally soya flour, flakes, and grits. Civilian consumption of the latter has increased from 35million pounds in 1941 to an estimated 100 million pounds in 1943. These products have a wide range of possible uses in such foods as sausage, bread, prepared baking mixes, doughnuts, macaroni and other paste goods, cereals, soups and crackers, but there has been reluctance on the part of some food processors to incorporate soya in their products. Part of this hesitation results from the manner in which the product must be labeled if it contains soya, and partly to uncertainty about consumer reaction. The factor limiting the use of soya products for human food is consumer demand, -- not limited supply.

Although the present rate of milling capacity for soya flour and grits is now about 1,400 million pounds per year, actual production is less than one-third that rate, or about 400 million pounds. Of this amount it is planned that about 38 percent will be for domestic use and 62 percent for export. As much as one billion pounds can quite easily be produced in 1944. About 300 million pounds of this total could be offered to United States civilians. With large supplies of soybeans and with unused milling capacity for flour and grits, housewives and industrial users in the United States are assured of all

the high grade soya products they may desire to consume in 1944.

Soybeans used as green shell beans, dry beans, and bean sprouts usually are of the so-called vegetable type of which there are about 18 varieties grown in the United States. The most commonly grown are the Mahto, Easycook, Kanro, and Hokkaido. These varieties have been developed to have a better flavor and to be more easily and quickly cooked than the field type bean used for oil, soybean oil meal, and soya flour and grits.

Data on production of the vegetable type of soybeans are meager, because production is small, scattered, and largely confined to gardens and small fields. One grower, reputedly the largest in the country, produced 300 acres this year, and it is estimated that total commercial production did not exceed 12,000 acres of vegetable type beans in 1943 compared with 11,480,000 acres of the field type harvested for beans.

The shelled green beans are used as a vegetable in growers' homes and some are canned commercially. It is estimated that production of canned soybeans was 30,000 cases in 1941, 100,000 cases in 1942, and 500,000 cases in 1943. A War Production Board conservation order restricts the canning of dry soybeans packed in glass containers to 50 percent of the closures used in the 1941 pack; and in tin containers to 35 percent of the weight of the product packed in 1941. The order, however, permits unlimited packing of shelled green soybeans in either glass or tin containers. Consequently it is estimated that about 80 percent of the 1943 pack is shelled green beans.

The present status of civilian demand is illustrated by reports from the Office of Price Administration that in Oklahoma and Arkansas, where production reputedly was quite heavy this year, sales of beans have not been adequate to move supplies on retailers' shelves. This may be owing to poor quality of some beans or possibly to the labeling. Some shelled green soybeans are labeled "Immature Green Soybeans" and some people are prejudiced against consuming an "immature" food. Present ration point values favor these beans, but nevertheless they have not moved in keeping with available supplies. An educational program in these two States should help to increase consumption.

In addition to the fresh and canned green soybeans and to some specialty products, shelled mature beans of the vegetable type are available in household-size packages for home cooking. Others may be purchased as roasted salted beans and as canned baked beans. The vegetable type beans have not been produced in larger volume, principally because the market for them has not been developed. Supplies are so small this year, compared with supplies of field soybeans, navy beans, peas, or string beans, that an intensive educational program designed to stimulate consumption might cause demand to exceed supply of the vegetable type bean. Such demand, however, would serve to increase production next year. It appears highly desirable to inform civilians of the uses and advantages of the vegetable type of soybeans and to encourage consumption and subsequent increased production of this type of bean.

For 1944, the principal types of soya products available to civilians, however, will be soya flour and grits, together with commercially made foods containing this highly nutritious legume. Supplies will be available in 1944 to meet all anticipated civilian food demands.

The real problem associated with soya and soya products in 1944 will not be the availability of supplies; but rather consumer acceptability and the need for an effective educational program.

SHALL WE PLANT SOYBEANS IN THE VICTORY GARDEN?

By H. W. Hochbaum
Extension Service, WFA
and Chairman, Victory Garden Committee

One of our aims in the Victory Garden Program is to encourage more people to plant the kinds of vegetables that are of greatest value in protecting health, and which at the same time are fairly easy to grow. Now some of the vegetable varieties of soybeans fill this need admirably, and everything should be done to encourage greater plantings by home gardeners. Soybeans are easily grown, they yield well, and they are rich in food value. The fresh green soybeans are very rich in vitamin A, especially the varieties that are deepest green in color. They are also a very good source of thiamin (vitamin B_1), and a good source of riboflavin (vitamin G) we are told in Leaflet 166 of the U. S. Department of Agriculture, entitled "Soybeans for the Table." Moreover, people learn to like soybeans as a fresh vegetable.

Some varieties come into bearing in mid August, and others later, so that by a selection of proper varieties, we can have them in bearing here until November. Especially valuable they are in areas where the gardens so often dry out in summer, for soybeans stand dry soil pretty well and yield something green when some of the garden is on a strike. Therefore, soybeans deserve every consideration, for one of the problems of the Victory gardener is to plan and cultivate the garden so that it produces to the fullest in late summer.

Mr. Werner Meyer on the Federal staff of the Extension Service had a fine Victory garden in Bethesda, Maryland this year, and said his garden was the finer and the more enjoyable because of the excellent yield he obtained of green soya. His family enjoyed them fresh from the garden, and through the winter they will enjoy the canned soybeans put up during the summer.

The Extension Service of the University of Tennessee found that three kinds of soybeans averaged 1 1/3 cups of shelled beans to three feet of row. This yield, however, has been exceeded by some gardeners who have good soil and favorable growing conditions. In fact, Mr. William J. Morse (who spoke to us earlier, and whose name will be linked permanently with soybeans not only in the Department of Agriculture but throughout the United States) has told me that some of the vegetable varieties of soybeans yield from two to two and one-half times as much as our common lima beans.

Mr. Morse recommends the following varieties for the Eastern and Central States: Hokkaido, Jogun, Imperial, and Kenro. Giant Green and Tastee are two early varieties recommended to enable enthusiasts to lengthen the season of production. For the Southern States, Seminold, Edsoy, Manda and Robusum are recommended. For those who have room and want to grow small dry beans for sprouts, the well known Tansoi is suggested.

Soybeans should be grown in rows 24-30 inches apart. Therefore, it may not be practical to grow them in the small Victory gardens, say gardens less than 30 X 30 feet. Too many Victory gardeners planted corn, potatoes, cucumbers, and other space-taking crops in 1943. Such crops do not yield enough

in small gardens, and in planting them the Victory gardener sacrifices space that might be given to other vegetables that yield more commensurately.

Soybeans should be planted at corn planting time when the ground is warm and all danger from late frost is past. The seeds should be planted about one inch deep and three inches apart in the row. At this rate, one pound of seed will plant about 400 feet of row. The seeds preferably should be inoculated with a soybean culture before planting.

The crop is cultivated like corn or any other garden vegetables. The beans are ready for use when the pods turn yellow green. This is from 100 to 130 days after planting.

So far as pests go, soybeans have one advantage and one disadvantage. The Mexican bean beetle which is such a pest on our common snap beans does not bother soybeans if other beans are nearby. But oh! how the rabbits love them. Some Eastern Victory Gardeners plant soybeans to lure the rabbits away from the snap beans.

Shall we plant soybeans in the Victory garden? Well, if we want a delightful fresh green vegetable in late summer and fall, one that is easily grown and yields well, we will by all means plant soybeans -- that is, provided we have enough space and a fairly long growing season. And on farms and in the larger Victory gardens in town and suburbs, we should also increase our plantings to have soys to can, to dry, and for sprouts.

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THE STORY OF SOYA PRODUCTS

By Donald S. Payne, Chief
Soya Products Section, Grain Products Branch,
Food Distribution Administration
War Food Administration

A historical narrative covering the complete story of soya food products would be far beyond the scope of this presentation. We are concerned at this time with the development of soya foods in America for use by the United Nations in the relief feeding of occupied territories and by our own domestic population. Through the impact of war economies over the last 2 years, work in this field has been rapid, though not anywhere near as rapid as the present economic picture based on over-all supply and demand would dictate as being sufficient to meet either the requirements of prudence or wisdom.

As planners for the nutritional welfare of the Nation, we should be concerned over the fact that development of soya foods has not progressed at a more rapid rate, and we can look only with chagrin upon the fact that this meeting could not have been held on December 7, 1941, instead of December 7, 1943. Had that been the case, then we might have had privilege at this time to proclaim that the soya situation was well in hand.

Largely through the efforts of the soybean processing industry itself, progress, yes, substantial progress, has been made since the formal declaration

of war by this country in developing, producing, and distributing acceptable edible soya flour and grits for use by the food industry and the housewife. These are the basic soya products that are readily available for use now and, therefore, the ones with which we have immediate concern. We are interested in their nutritive value, their production, their utilization, and their distribution.

The primary nutritional value of soya flour and grits lies in the high protein content of these products. In repeated laboratory and clinical tests, this protein content, on the basis of nutritional completeness, has been shown to rank near the top of our list of natural protein foods. The nutritive value of soya proteins for humans is as firmly established as is that of the proteins of meat, milk, eggs, and fish.

Since the biological quality of soya protein is established, we are inclined also to look slightly askance at the flood of queries being currently raised relative to the levels of soya that must be used or consumed to have nutritional significance. Such questions are, of course, pertinent to the whole protein nutrition story, and we have ample scientific data on the influence of feeding proteins at varying levels. We know that certain well-defined levels are necessary for normal growth and development. On the other hand, we know also from the practical viewpoint that although three servings of a food may be necessary to satisfy our day's requirements for certain nutrients, one serving is better than none at all.

Although pre-war nutritional surveys did not reveal direct evidence of protein deficiencies in the American diet, we cannot help but believe, in the face of recent reports by Army doctors on draftees covering rejections on the nutritional basis and surveys of physical development, that such deficiencies did exist. Be that as it may, we know that the protein requirements of our civilian and armed forces under war conditions are greater than ever before, we know that our allies are asking us for greater supplies of protein foods than were ever exported before, and we know that in starved war-torn populations "war edema," a protein deficiency disease, is the greatest of all scourges. Thus, to meet the protein requirements for the balance of the war and during the rehabilitation period immediately thereafter, we know that we must produce a rather fantastic quantity of protein food.

To produce all of this required protein in the form of animal products would, if possible at all, result in the complete disruption of our domestic economy. Thus, those food producers who have thought primarily of proteins as animal products have widely proclaimed that the United States cannot meet all of the above requirements. We dare not advance an opinion as to whether we can or cannot meet them, but we do contend that the application of American ingenuity to the growing, harvesting, and processing of the soybean makes it possible for us to meet a far greater percentage of these requirements than would be possible by any other procedure.

Let us consider briefly just how prolific the soybean is as a source of protein. In 1943, we produced 209 million bushels of soybeans. At 60 pounds per bushel, if we use an average percentage protein composition of 40 percent, this production represents 5,016 million pounds of protein.

Now, we know from the records of the National Research Council that 5,867 million pounds of protein was the total produced by the Nation in 1942 in the form of beef, veal, lamb, mutton, pork, edible packing house byproducts, eggs, milk, chicken, turkeys, and dry beans and peas. Thus, in the soybean, we have a potential source of human protein food of high biological quality nearly equivalent to all other agricultural sources combined. We should also consider the over-all cost of producing soya proteins as compared with proteins of animal origin. From table 1, we can see that the basic cost of producing soybean protein in terms of man hours and land acreage is but a small fraction of that involved in producing the proteins of beef, pork, poultry, eggs, and dairy products.

Table 1 - Average output of protein from various sources in terms of land and labor

Products	Land (1 acre)	Labor (100 hrs.)
	lbs.	lbs.
Beef	7	45
Pork	18	58
Poultry	25	74
Eggs	26	56
Milk	39	89
Soybeans	339	2,821

The major part of the soybean proteins grown are now processed into soybean oil meal for animal feeding, but a small yet substantial percentage of the crop will be directly processed into flour and grits for human consumption.

For the increased production of animal protein feed, increased amounts of soybean oil meal are necessary. This was first provided for, and production of this product has been increased by more than 100 percent since 1941. In addition to this increase, the capacity of the industry to process soybeans directly into human food was increased from 400 million pounds annually in December 1942 to 1,400 million pounds. This increased capacity was obtained in less than 1 year after it was requested by the Government, and the maintenance of that capacity is now a reality.

There are basically, depending on the method employed in processing, three distinct types of soya flour and grits.

1. The full-fat products are made from cleaned, selected, dehulled, and debittered soybeans. All of the original fat of the bean is present. These products have only about 40 percent of protein but due to the 18 to 20 percent fat, lecithin, and choline present, have higher caloric values and higher amounts of nutritionally essential fatty acids not found with the other two types.

2. The low-to-medium fat products are made from cleaned, selected, dehulled, and debittered beans from which the major portion of the fat has been removed by the expeller process. They contain 6 to 7 percent of fat.

3. The low or essentially fat-free products are made from cleaned, selected, dehulled, and debittered beans from which all but 1 percent or less of the fatty constituents have been removed through solvent extraction.

The protein content of the two latter types of soya flour and grits averages about 47 and 52 percent respectively. The production of flour, grits, or flakes depends on the grinding or flaking processes utilized and the application of the proper screening or air flotation separation methods. It should be emphasized here, however, that the soybean milling industry is as cognizant of the more rigid requirements for cleanliness and sanitary control in the preparation of human food over the manufacture of animal feed as any other food industry, and that the processes employed have been so constructed to meet these requirements that the soya flour and grits plant of today has little, if any, resemblance to a soybean oil meal plant.

So much has been said about the protein content of soybeans that we often hear otherwise well informed persons writing off the remaining constituents of soya products as of an inert and indigestible nature. Nothing could be further from the truth. The carbohydrate fraction of soya products, which ranges from 24.5 to 3.7 percent, is largely (about 85 percent) digestible and is composed of sucrose, stachyose, raffinose, galactans, dextrine, and pentosans. The latter of course, indigestible.

Soya products contain substantial quantities of the essential mineral elements: Calcium (0.210 percent); magnesium (0.223 percent); phosphorous (0.592 percent); sulfur (0.406 percent); iron (0.02 percent); and potassium (1.913 percent). The most recent analytical data that we have on the market flours substantiate the findings on the soybean itself, in that they show these products to contain substantial quantities of the vitamins of the B complex. The results of these analyses are given in table 2. Although small quantities of Vitamins A and D may also be present, no claim should be made relative to their nutritional significance.

Table 2 - Average content of B complex vitamins in various types of soya flours (All figures on a per-pound basis)

Type of Flour	Vitamins						
	Thiamine	Riboflavin	Niacin	Pantothenic acid	Pyrodoxin	Inositol	Biotin
	I.U.	Gamma	Gamma	Gamma	Gamma	Mgs.	Gamma
Full-fat	775	1,600	17,000	5,800	2,900	794	260
Low-fat (expeller)	900	1,800	19,000	7,000	2,800	900	300
Low-fat (extracted)	1,100	2,000	24,000	6,000	1/	1,000	300

1/ Data Incomplete

Production and Distribution

During the years 1935 to 1941, the capacity for the production of soya flour and grits was 300 million pounds per year. Of this capacity, only about 25 to 50 million pounds were produced. In the year 1942, production increased to approximately 125 million pounds. However, nearly half, or around 75 million pounds, were exported by Lend-Lease. The present capacity, at the end of 1943, for the production of soya flour and grits is approximately 1,400 million pounds. Of this potential capacity, the companies are now producing at the rate of 400 million pounds per year. These 400 million pounds are distributed as follows:

250 million pounds to lend-lease and relief feeding

150 million pounds to home use

For the year of 1944, it is planned that only about 75 percent of the entire 1,400 million pounds capacity provided by the industry will be utilized. It is estimated that at least 300 million pounds of products now being produced will be available and distributed within the United States for domestic use. The balance will be taken by our allies under lend-lease and relief feeding in occupied territories.

Prior to 1943, soya flour and grits could not be obtained by the American housewife except through health food stores at a price of about 35 cents per pound. During this year, however, national distribution has been greatly extended through normal retail grocery channels. The story of how this distribution was obtained is a fascinating one, of which only the barest outline can be given here.

At the outset it was realized by the industry and the Department that these were new products to the American housewife and as such would have to overcome many taste and established food habit prejudices. Thus, it was apparent that the successful introduction of them would have to go hand in hand with an intensive educational campaign designed to teach the consumer what could be expected in the way of nutritional value and how they should be used. The soybean processors agreed to go all out for this distribution if the War Food Administration would aid in conducting this essential educational campaign.

Soya Flour and Grits on the Retail Market 1/

A substantial start was made when the A. E. Staley Manufacturing Company, Decatur, Ill., opened test markets early in June of this year with

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1/ Although it is not customary to use either firm names or trade names in a Government publication, it was necessary to do so in this case to convey information as to sources and availability of the different types of supplies. To give a complete list of dealers and products is generally impracticable, and in furnishing this information in an effort to be of assistance, it should be understood that no discrimination is intended and no guarantee of reliability is implied.

1- and 3-pound packages of "Stoy," a low-fat expeller-type soya flour, in Sacramento, Calif., Providence, R. I., Utica, N. Y., Harrisburg, Pa., Columbia, S. C., Shreveport, La., Peoria, Ill., and Sioux City, Iowa. By September, following an analysis of the results obtained in these test markets, distribution of this product was expanded to take in the lower one-third of the entire State of California; two-thirds of the State of South Carolina; all of Pennsylvania, Delaware, New Jersey, Massachusetts, Connecticut, Rhode Island, and Minnesota; the southern half of Vermont and New Hampshire; an area of about 100 miles in diameter, surrounding St. Louis, Mo., in the States of Illinois and Missouri; six counties each in North and South Dakota; the northern half of Illinois, including the greater Chicago area; and the eastern half of Wisconsin. By December 1, 1943 distribution of this product was further extended to cover additional areas in New York State, including the City of New York, and in southern Michigan and northern Ohio and Indiana. Complete national distribution of this product is anticipated by March 1, 1944.

At least two other large processor-distributors have also started on campaigns for nation-wide distribution. The Archer-Daniels-Midland Company has initiated the distribution of "Viva Soy," a low-fat extraction process type flour. This product was first introduced into Minneapolis, St. Paul, and St. Cloud, Minn., its distribution being gradually expanded throughout southern and central Minnesota, western Wisconsin, northern Iowa, and the eastern fringe of the Dakotas. The Glidden Company, Cleveland, Ohio, through Durkee Famous Foods, has recently introduced into the test market areas of Detroit, Mich., Pittsburgh, Pa., Portland, Maine, New York, N.Y., and Minneapolis, and St. Paul, Minn., "Durkee's Soya Bits," a low-fat expeller-type grit, and "Durkee's Soyarich," a full-fat type soya flour.

Other processor-distributors are The Central Soya Company, Decatur, Ind., distributing "Me-T-Soy," an extraction-type grit that is marketed through retail grocers in Indiana, Ohio, and Illinois, and The Soya Corporation of America, introducing both a full-fat type flour and grit throughout New York City, Philadelphia, Baltimore, and Washington marketing areas.

Closely following the lead of these processor-distributors, private label-brand grocery houses started to package these products for retail distribution at popular prices. These has been very widely distributed. These are now packaged by G.L.F. Farm Products, Inc., Ithaca, N.Y., a 2-pound package of full-fat type soya flour and a 2-pound package of a toasted soya flake of the low-fat expeller-type, distributed throughout the rural and metropolitan markets of northern Pennsylvania, New York State, and New England. This company is planning to introduce in the near future a 2-pound package of low-fat, expeller-type soya grits in the same markets.

The Vee-Bee Company of Chicago, Ill., with its "Vee-Bee" brand soya flour and soya grits, and the P. D. Ridenour Company, Chicago, Ill,, with its "Little Major," brand flour of the low-fat extraction type, have both attained distribution of 1-pound packages through jobbers in 36 of the 48 States. These States cover all parts of the United States except the 13 inter-mountain, Southwestern, and the Great Plains States of Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas. The H. D. Lee Company is distributing

the Lee Brand soy flour and soya grits in 1-pound packages throughout Kansas, Oklahoma, Colorado, southern Nebraska, Arkansas, and Missouri.

The Battle Creek Food Company, Battle Creek, Mich., and The Walker Company, Chicago, Ill., continue to market retail packages of full-fat soya flour in specialty stores throughout the Nation.

We can see from the widespread distribution that these companies are now making these products available in retail stores throughout most of the Nation. The availability in certain areas is probably very 'spotty' at present, but this situation will improve rapidly, especially if an educational program builds up consumer demand.

Reports to date on acceptance of soya flour and grits are encouraging in certain respects. Repeat sales indicate that there is a reasonable percentage of first-time purchasers who will continue to buy again and again.

In addition to these retail distributors, the following manufacturers sell flour and grits in wholesale quantities to food manufacturers, restaurants, and institutions.

Allies Mills, Inc.
3400 Board of Trade Bldg.
Chicago, Ill.
Mr. C.F. Marshall, Sales Mgr.

Archer-Daniels-Midland Company
Minneapolis, Minn.
Mr. R. G. Brierley, Sales Mgr.

Central Soya Company, Inc.
300 Old First Bank Bldg.
Fort Wayne, Ind.
Mr. D. W. McMillan, Jr., Vice Pres.

Commander-Larabee Milling Company
733 Marquette Avenue
Minneapolis, Minn.
Mr. R. G. Brierley, Sales Mgr.

The Glidden Company
Soya Products Division
5165 W. Moffat Street
Chicago, 39, Ill.
Mr. A. A. Levinson, Sales Mgr.

Proctor & Gamble Company
Ivorydale, Ohio
Mr. James G. Perry, Sales Mgr.

Shellabarger Grain Company
Decatur, Ill.
Mr. W. L. Shellabarger, Pres.

Soya Corporation of America
Hagerstown, Md.
Dr. Armand Burke, Pres.

Soya Products Company
667 Madison Avenue
New York, N. Y.
Dr. Harold Otto, Pres.

Spencer Kellog and Sons, Inc.
Decatur, Ill.
Mr. H. A. Clendorf, Sales Mgr.

A. E. Staley Manufacturing Co.
Decatur, Ill.
Mr. E. K. Scheiter, Vice-Pres.

Swift & Company
Soy Bean Mill
Champaign, Ill.
Mr. N. P. Noble, Sales Mg.

Soya in Mixed Foods

A great many food products are now featuring soya. Twenty to twenty-five percent of soya flour or grits are being used successfully in prepared pancake mixtures. Soy Food Mills, Inc., Chicago, Ill., are distributing their "Golden-Mix," a wheat and soy pancake flour, throughout the eastern and midwestern part of the country. The Allied Mills, Inc., are distributing "Kreemex Pancake Flour," throughout the States of New York and Ohio. This is a wheat, corn, and soya flour mixture. Pillsbury's "Golden Bake Mix," a wheat flour, soya grit mixture, is distributed and widely advertised throughout the Northeastern, East Central, South Atlantic and North Pacific areas.

Confections, Inc., of Chicago, Ill., are distributing "Soy King," a wheat and soya flour mixture, through the Pacific Coast States, the Rocky Mountain region out of Denver, Colo., and throughout the Central West and Northeastern States. Georgie Porgie Mills, Inc., Council Bluffs, Iowa, are distributing "Soya Creme," a wheat and soya flour combination, throughout Iowa and the Central West. We have reports that all of the above mixes have met with exceptional favor from the public as judged by repeat sales.

A few cereal companies have on the market products that contain soya. The Sturdiwheat Company, Red Wing, Minn., is distributing "Soyawheat," a hot cereal consisting of 50-50 blend of soya flour and wheat products, throughout Minnesota, Iowa, Nebraska, North Dakota, South Dakota, western Illinois, western Wisconsin, Kansas, and Missouri. This product has been a good repeat seller. We know of at least two large cereal companies with national distribution that have developed products containing soya which they are now preparing to manufacture and distribute.

The "Paste Goods Industry" is finding that the use of soya flour has certain advantages. The Pfaffman Company, Cleveland, Ohio, manufactures and distributes in 35 States "Soy Egg Noodles," "Soy Macaroni," "Soy Spaghetti," "Soy Sea Shells," "Soy Ringlets," and "Soy A B C's." These products contain 10 percent of soya flour. The Prince Macaroni Manufacturing Company, Lowell, Mass., manufactures under the trade name "Veta Roni," spaghetti, linguine, macaroni, shells, and pastine containing 10 percent of soya flour. These products are distributed throughout New England, New York, New Jersey, and Pennsylvania. The Quality Macaroni Company, St. Paul, Minn., produces "Soya wheat Keets," "Shell-ets," "Sal-ets," macaroni, and spaghetti, containing 10 percent of soya flour for distribution in Minnesota, Wisconsin, Iowa, North Dakota, South Dakota, Montana, Texas, and Nebraska. Jellum, Inc., Joliet, Ill., are distributing under the brand name "Soya Gold," a wheat and soya flour egg noodle throughout the Middle West. This product contains 15 percent of soya flour. To mention a few others, The Atlantic Macaroni Company, New York City, the Mission Macaroni Company and the Golden Grain Macaroni Company, both of Seattle Washington, and Traficanti Brothers, Chicago, Ill., also manufacture for local distribution a variety of products containing soya flour in amounts ranging from 10 to 15 percent.

Soya flour is being used today extensively, both in white bread as an ingredient and in specialty breads. As an example of the former, the

General Baking Company uses 3 percent of soya flour in "Bond Bread". This bread is one of the most widely distributed loaves offered the American public. It is sold throughout Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, West Virginia, Ohio, Kentucky, Indiana, Michigan, Missouri, Nevada, Kansas, and Louisiana. Of the latter, the Oroweat Baking Company, San Francisco, California, uses from 20 to 25 percent soya flour in the manufacture of a specialty loaf that is sold throughout California, Nevada, Oregon, Idaho, Washington, New Mexico, and Arizona. There is ample room for a further extension of the use of soya flour in these fields and we know that many large bakers throughout the country are preparing to use it within the near future.

In the cracker and cookie field, soya products have had a rather sensational acceptance all over the country. As one example the National Biscuit Company has national distribution of "Nabisco Soyas," containing 20 percent of soya flour. In October they introduced a new product called "Luscious Cremes," containing 27 percent of soya flour, and promptly sold in one market alone 103,680 packets in that month. They also produce a product, called "Fruited Royal," containing 4-2/3 percent soya flour, which they distribute out of Albany, Buffalo, Elmira, Glens Falls, Newburgh, Rochester, Syracuse, N. Y., Burlington, Vt., Wilmington, N. C., Charleston, S. C., New Britian Conn., Cleveland, and Birmingham. L. M. Peterson and Company, Brooklyn, N. Y., distribute "Eatsum Wafers," the Burry Biscuit Corporation, Elizabeth, N. J. sell "Swifties," the American Bakeries, Inc. Birmingham, Ala. sell "Soya Cookies," the Cubbison Cracker Co., Los Angeles, Calif., sell "Soya Toast," etc.

If the quality of the frankfurters or sausages that you buy is poor, don't blame it on soya flour or soya grits, for the chances are 99 to 1 that soya products were not used. I make this statement since the most common complaint voiced against prepared meat products today is that the quality is poor because it contains soybeans. As a matter of fact, little if any soybean products are going into prepared meats today. Due indirectly to war-time restrictions on meat, sales of soya products to meat processors have diminished to the point where they represent an item of little if any consequence to them. This we feel to be an abnormal situation, since the advantages of limited use in this field, from the standpoints of quality, nutrition, and economics, are glaringly apparent.

Roasted salted soybeans are about as common now as salted peanuts, but not many people realize that soya flour and grits are at present universally used in chocolate bar and any other candy. For further information on these uses I might refer you to the Curtis Candy Co., Chicago, Ill., or the Clark Candy Co., Pittsburgh, Pa.

Soya flour is also used in prepared muffin mixes, such as "Duff's Hot Muffin Mix," distributed by P. Duff & Sons., Inc., Pittsburgh, Pa., and "Golden Muffin Mix," distributed by Soy Food Mills, Chicago, Ill.

A large number of dry soup mix manufacturers are experimenting with soya flour and preparing products for domestic distribution.

Soya flour and grits are now and will continue to be used extensively in foods prepared for lend-lease and relief feeding. Pea-soya soup, spinach-soya soup, cheese-soya sauce, oat-soya cereal, whole wheat-soya cereal,

wheat-soya-egg macaroni and vegetable-cereal-soya stew mixes are being purchased in appreciable quantities. Reports from Europe indicate that these foods have shipped well and have been received with more favor than any other prepared foods which have been used. Pork-soya sausage links have been purchased in tremendous quantities under lend-lease.

In view of all that has been said, let us not forget that the little soybean produces the oil which constitutes the backbone of the War Food Administration's program for vegetable salad oils, shortening, and oleomargarine, and that soybean lecithin is an ingredient in hundreds of prepared foods.

Information Activity

The Government has done much to bring soya products to the attention of the public. Through our close contact with the industry, it was possible to time releases of information material to coincide with availability. Material issued early in the year was carefully worded to designate soya as a coming food not yet available. Releases of the late spring and early summer were limited in number and were concerned chiefly with production and the products that would be available within a few months. Later, the number of releases were increased and the theme shifted to current availability on many grocers' shelves and the variety of foods containing soya. Throughout all of these releases, information on methods for the utilization of soya flour and grits and data on the nutritional value of soya have been interwoven.

A summary and description of the Food Distribution Administration's information activities relating to soybean products will be available shortly to those of you who may be interested in this work. This report includes the details on magazine stories, press, and radio releases.

Nine coast-to-coast radio shows have featured the news of soya food products since June 1943. Over 15 prepared radio scripts and stories featuring soya have been distributed since May 1943. Through these combined services the soya story has been brought to the attention of the Nation's 900 radio stations. Considerable specialized information has been released through restaurant associations and institutional groups.

The time may be coming soon when soya products will have lost their initial news value as far as broadcasters and editors are concerned. However, even more effort to put the products across will be essential, more educational advertising by industry, more exhibits and visual displays for groups starting to use the products, and more specific suggestions and recommendations by Nutrition Committees for additional educational work at the community level.

Reference List of Some of the Material Available on Soya Products.

Recipes:

BHNHE - "Cooking With Soya Flour and Grits" - Folder

BHNHE - Posters, set of 4, showing various principles of soya cookery (20 cents from GPO)

BHNHE - "School Lunch Recipes" (In press)

A. E. Staley Manufacturing Company
Decatur, Ill.

Durkee Famous Foods
Elmhurst, Long Island, N. Y.

Commander-Larabee
Minneapolis, Minn.

Spencer Kellogg & Sons, Inc.
Decatur, Ill.

— Recipe leaflets for family cookery.

The Glidden Company
Chicago, Ill.

Commander-Larabee
Minneapolis, Minn.

Spencer Kellogg & Sons, Inc.
Soybean Products Division
Decatur, Ill.

— Booklets containing large quantity recipes - suitable for restaurant, cafeterias, and some for school lunch use.

Speeches:

"Soya Flour in the Manufacture of Macaroni and Other Paste Goods" - by Donald S. Payne

"Soya Soon a Grocery Staple" - Donald S. Payne

Others:

"What is Soy Flour?" - Soy Flour Association, 3818 Board of Trade Bldg., Chicago, Ill.

"Soybean Food" - (Reprinted from "The Soybean Digest," Hudson, Iowa) Available in limited quantity from Soya Products Section, Grain Products Branch, F.D.A. Contains addresses presented at the 22d annual convention (Sept. 1942) of American Soybean Association. Figures given in book are out of date, but other information is valuable for background.

"Soya Products - Availability, Nutritional Values and Utilization" (semi-technical) by Betty G. Leaming, Soya Products Section, Grain Products Branch, F.D.A., to be released in the December issue of the "Journal of the American Dietetics Association" (also gives references.)

"Advances in Protein Chemistry" - Book - In Press.
Editors, Dr. M. L. Anson and Dr. John T. Edsall
Publishers, Academic Press, Inc.
Contains chapter "Soybean Protein In Human Nutrition" by Donald S. Payne and L. S. Stuart of the Soya Products Section. Gives an over-all picture and review, technical in nature. Also gives many references.

INFORMATION PROGRAM ON SOY BEANS AND SOYA PRODUCTS

By Keith Vinebaugh
Acting Director of Information
U. S. Department of Agriculture

No new group of food products has ever been given more widespread recognition in so short a time through the media of mass communication than soya products. And we seldom find so receptive an audience for information about new foods as we have had for news about soya products. The wartime demand for protein foods has made this an opportune time to introduce these foods.

The demand for information about these foods developed more rapidly than the supply of soya products, so for many months we were in the position of cautioning writers and publishers not to go too far or too fast. The situation created an atmosphere of suspense which in itself is an effective means of developing a desire for more information. Until a short time ago soya was pictured as a coming food but not yet available. In the meantime, however, tests were being made and recipes developed in Department of Agriculture research laboratories, and at the suggestion of the Department recipes were also being developed in the testing kitchens operated by women's magazines and other commercial organizations.

It was not until late summer of this year that we were able to talk about soya products as being currently available on grocers' shelves. Even now they are not everywhere available, but can be made so if sufficient demand is created.

While awaiting the availability of soya products generally, there has been time to prepare and print publications containing information about the value of these protein-rich foods and how to prepare and use them.

Since early last summer the story of soya products as human food has been featured on network radio shows heard by more than 50 million people. These included government-produced radio shows and numerous other sustaining and sponsored network programs. In addition, through radio news services, through radio material for women's program directors, and through information radio supplied to employees and collaborators, the story of soya products has been brought to the attention of the nations 900 radio stations over and over again.

There has been a great deal of interest among magazine editors in information on soya products and a great deal of information has been supplied through a special service to editors of women's magazines, a service to general magazines, and through direct contacts by employees with magazine representatives. The Consumers' Guide, published by the Food Distribution Administration has carried information on soya products to its thousands of subscribers.

Food trade papers and journals and the grocery, restaurant, and food manufacturing trades have received information in regular services of the Food Distribution Administration.

Numerous press releases have reported information on soya products as rapidly as it developed. Food and Home Notes, which is a regular service for women's page editors and nutrition leaders has carried similar information.

As a result of 1500 cooking and tasting tests, a recipe leaflet, "Cooking With Soya Flour and Grits," has been issued and is available for general distribution. This information was developed as a part of a soya project in which the Bureau of Human Nutrition and Home Economics, and the Food Distribution Administration cooperated.

The Agricultural Research Administration now has in the process of printing a publication on Soybeans and Soybean Products as Food, which discusses briefly nutritive values, use, and preparation of soybeans and some of their products, including green and dried vegetable beans; flour, grits, and flakes; "milk" and curd.

Looking back over the work of the last few months, it is evident that an extensive information job has been done by all concerned. Manufacturers and distributors will add more and more to this effort through advertising space and commercial radio time.

But a large and important part of the job still remains to be done locally through meetings, exhibits, and demonstrations, and through press and radio efforts of locally known and recognized authorities.

A large part of the public can be reached quickly in a general way through the media of mass communication. For many this method will be effective in encouraging the use of soya products. But for many, the most effective means of telling the soya story will be through personal contact in community activity. The services of the Department of Agriculture and the War Food Administration will continue to be available to spread information about these important foods, and if more intensive campaign efforts are needed we shall be glad to solicit the cooperation of the Office of War Information and the promotion which this agency can give.

In telling the story of soya products I feel that we should give them the place in our panorama of foods which they deserve in their own right -- not as a substitute for meats or cereals or other vegetables, and not as a low-cost food for the poor, but as an appetizing, nutritional addition to our national diet that can make us a better-fed, healthier nation.

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PREPARATION OF SOYBEANS AND SOYA PRODUCTS IN THE HOME

By Mary E. Kirkpatrick
Bureau of Human Nutrition and Home Economics
Agricultural Research Administration
U. S. Department of Agriculture

Many people have experienced difficulty in the use of green soybeans grown in their Victory gardens, because they are hard to shell. Boiling the beans in the pod for 3 to 5 minutes makes the shelling much easier. Some workers have reported success with the use of a small pea sheller; others have not found it satisfactory. As a new purchase, this equipment may not be available to many homemakers.

The cooking time necessary for green soybeans depends upon the variety; some cook as quickly as green peas, others require a longer time, more like lima beans. The texture of the cooked bean is not mealy or soft but more firm and slightly crisp.

When dried, soybeans may be used in much the same way as navy and lima beans. Dry soybeans should be soaked before cooking, preferably overnight for they require longer soaking than navy beans. The subsequent cooking time depends upon the variety; it may be 2 hours or sometimes less. If a pressure cooker is used, at 15 pounds pressure the cooking time will be only 15 to 30 minutes, depending upon the variety.

Suggestions for preparing both the fresh green and the dry soybeans are given in U.S.D.A. Leaflet 166, "Soybeans for the Table."

Soya products are new products -- not comparable to some familiar food as are the green and the dry soybeans. Although called flour, the soya flour contains very little starch hence it cannot be used for thickening as are the wheat flours. It does give body, however, and in many cases apparent thickness. The term soya grits may immediately bring to mind hominy grits, yet their cookery is not comparable, for soya grits are best used as mixers and not alone.

As you have heard in the previous discussion this morning manufacturers are making several types of soya flours: the full fat flour, and both expeller and extraction low fat soya flour. They also make full and low fat soya grits.

We have used all of these products in our Beltsville laboratory and have found some variation when comparing them in recipes. A brief exhibit of the water absorbing quality of these soya products will illustrate this point:

> I have here three beakers which contain (1) full fat flour, (2) expeller low fat flour, and (3) extraction low fat flour, in each case one half cup measure. One half cup of water has been stirred in with the soya in each beaker. Note the difference in consistency.
>
> These differences carry over to much the same extent when soya flours are used in food mixtures. In making oatmeal cookies the same measure of soya was used in all samples. All ingredients and conditions were the same except the type of soya. The first sample included full fat soya; the second, low fat expeller flour; and the third, low fat extraction flour. Notice that the first cookie is crisp; the second one more soft and chewy; both good products, but quite different. The third one is a bit too dry for a standard drop cookie. Another sample, the fourth, was made like the third in every respect except that the liquid was increased to give the unbaked batter a consistency comparable to that of the usual drop cookies. These cookie samples illustrate briefly the manner in which we develop our recipes. Our last step is to increase the liquid somewhat so that the completed recipes give a satisfactory cookie with all soyas.

If the homemaker uses special soya recipes, probably these adjustments will have been made for her; but if she wishes to use soya in her own recipes, she will by experience become acquainted with the characteristics shown here.

Our aim is to develop recipes which will be successful for the homemaker regardless of the type of flour she may purchase. To learn what experience she may have and to learn them first, we have used the various types of soya products from six manufacturers.

A number of recipes developed in our laboratories have been published in a folder entitled "Cooking with soya flour and grits," known as AWI-73, and available without charge through the Office of Information, U. S. Department of Agriculture, Washington 25, D. C. A set of four posters (15 x 20 inches) "Get acquainted with Soya Flour and Grits" has just come from the press. These posters, prepared by the Bureau of Human Nutrition and Home Economics, are sold for 20 cents a set by the Superintendent of Documents, Government Printing Office, Washington, D. C. If you wish to order them, send cash, a check, or money order to the GPO; not stamps.

Soya is so new that there are still many ways of using it which we have not tested. We have, however, developed a few practices which we follow in our experimental work. These I will state as ten rules which may be helpful to the homemaker in her use of soya products:

(1) Incorporate soya products as an ingredient in familiar recipes.

(2) Recognize that like many other foods soya has a typical flavor of its own, so develop a liking for it by repeated use.

(3) Use in relative small amounts. In this way soya will change the familiar food less and may be more acceptable than when used in large quantities.

(4) Combine with foods of like texture, for example - soya grits with cereals, ground meat, bread crumbs, granular foods; soya flour in soups, sauces, creamy puddings, quick breads, and yeast breads. In some recipes, either flour or grits can be used satisfactorily.

(5) Have the same standards of acceptability as for foods without soya. In the uncooked foods this means the same consistency as in soups, sauces, and batters like griddle cakes and muffins. In the cooked food it is necessary to have the consistency, texture, volume and other characteristics as nearly like the standard recipe as possible.

(6) Increase the liquid slightly if necessary to obtain this standard consistency in the cooked food. Soya does not thicken, yet it does give body. The increase in apparent thickness may be more pronounced in the uncooked than in the cooked product. So increase the liquid carefully.

(7) Expect soya to add a richness of flavor to bland foods such as white sauce, gravies, soups, and cornstarch puddings.

(8) Be ready to add more salt, onion, and other seasonings in a mixture where these are used. Even a small quantity of soya requires considerable seasoning, leaving less for the other ingredients.

(9) Enjoy the rich brown crust soya gives to griddle cakes, breads, potato cakes, and other cooked foods.

(10) When considering its cost, remember that soya may be replacing expensive protein rather than less expensive grain or cereal foods.

Highlights of the discussion
that followed the presentation of the papers

Availability of SOYBEANS for human food. Garden varieties of soybeans will doubtless be available to some extent on the market in 1944, as dry soybeans and as canned green shelled soybeans. These varieties (also known as "vegetable type" soybeans) will be grown as a Victory garden product where space and other growing conditions make this feasible. Therefore, it is desirable for an educational program to include information on the growing of vegetable varieties, and on the food value and use of the beans in their fresh green and their dry state, and on the home drying and canning of soybeans.

Sprouting of soybeans. It would not seem advisable to encourage the sprouting of soybeans to any large extent at this time. While soybean sprouts are a source of vitamin C and riboflavin, other sources of these vitamins are available to most families at less expense in both time and money. Protein, for which soybeans are so valuable, is doubtless lost to a large extent in the germination process. Furthermore, not all varieties of soybeans germinate quickly enough to be used for sprouts. With the possibility of a limited supply of soybeans to be used as beans (because of the need to extract soybean oil and to manufacture other soya products), any that are available to the family should be prepared as beans to make use of their maximum food value. The practice of sprouting soybeans would be encouraged, then, only as a means of adding vitamin C to the diet where other sources of this vitamin were not available to the family.

Availability of SOYA PRODUCTS for human food. For the most part, civilians will use their soybeans in the form of soya products, particularly soya flour and soya grits. Though 90 percent of the soybean crop is being set aside for the production of animal feed of high protein value, the remaining 10 percent of the crop which is allocated for human consumption actually amounts to a tremendous supply, far more than has ever been used as human food before. The total will be several hundred million pounds of soya products for home use, which suggests immediately the need for an extensive educational program.

Consumer reaction to new products. Lack of demand for canned green shelled soybeans (as evidenced by their failure to move from grocers' shelves in two midwestern States where they were abundantly available) was cited as an example of lack of consumer interest in a new or unfamiliar product. This may have been due in part to the fact that these beans had to be labeled "immature" according to Food and Drug Administration regulations. That ration points are required for the canned green soybeans would not seem to be the explanation in view of the fact that there is a heavy demand for canned pork and (navy) beans which have high point value in proportion to the dry navy beans. Consumer interest in canned green soybeans might well be stimulated.

Attention was called to the fact that sausage meat does not sell well when consumers think it contains soya products. Actually, only a very small proportion of the sausage meat on the market contains soya, because of the Food and Drug Administration regulation that if soya products are added, the sausage meat must be labeled "imitation sausage meat."

Acceptability of a new food like soya products depends upon three factors! The availability of the food on the market, an educational program to encourage its use, and its price. The statement was made that "As far as availability and price are concerned, the soybean is in a good position. The supply of soybeans and the milling capacity for the manufacture of soya products are large enough to fill all demands. Soya products are being put on the grocers' shelves, and the price is right. The general availability, value of, and uses for, these products should be brought to the attention of consumers to increase their acceptability."